

REMARKS

Claims 16, 19 and 29 are amended. Claims 17 and 18 are cancelled. New claims 110-111 are added. Claims 16, 19-39 and 110-111 are pending in the application.

Claims 16 and 27-28 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Pavate, U.S. Patent No. 6,391,163. The Examiner is reminded by direction to MPEP §2131 that anticipation requires each and every element of a claim to be disclosed in a single prior art reference. Claims 16, 27 and 28 are allowable over Pavate for at least the reason that Pavate fails to disclose each and every element in any of those claims.

As amended, independent claim 16 recites a copper alloy sputtering target containing copper and at least one alloying element selected from the recited group, and having an average grain size of less than 1 micron with a grain size uniformity standard deviation throughout the target of less than or equal to about 15% (1-sigma). The amendment to claim 16 incorporates subject matter of claim 17 and 18. Claims 17 and 18 are appropriately cancelled. As acknowledged by the Examiner at page 3 of the present Action, Pavate does not disclose the recited average grain size of less than 1 micron. Nor does Pavate disclose a recited grain size uniformity standard deviation of less than or equal to 15% (1-sigma) throughout the target. Accordingly, independent claim 16 is not anticipated by Pavate and is allowable over this reference.

Dependent claims 27 and 28 are not anticipated by Pavate for at least the reason that they depend from non-anticipated base claim 16.

Claims 17-26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Pavate, individually or over Pavate in further view of Perry, U.S. Patent No. 6,896,748. The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness

rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Pending claims 19-26 are allowable over Pavate and Perry for at least the reason that the references, individually or in combination, fail to disclose or suggest each and every element in any of those claims.

As indicated above, amended claim 16 recites a copper alloy sputtering target having an average grain size of less than 1 micron with a grain size uniformity standard deviation throughout the target of less than or equal to about 15% (1-sigma). Claim 16 further recites specific alloying element content and target hardness of at least 40 HB. As acknowledged by the Examiner at page 3 of the present Action, Pavate does not disclose any particular grain size and merely indicates that grain size should be small to achieve better sputtering characteristics. However, the teaching of a desirable trait does not disclose or in any way suggest the particular range of grain size recited, or teach or suggest the uniformity of such grain size throughout the target. Further, the general indication set forth by Pavate that small grain size is desirable does not set forth any methodology for achieving the claim 16 recited average grain size of less than 1 micron, or the recited grain size uniformity.

Referring to the Perry disclosure, such indicates that methodology of the invention can produce grain sizes less than 8 microns and can maintain grain size at 0.1-7.5 microns (Col. 3, lines 42-47). However, the disclosure of grains being present within a range of grain sizes does not disclose any overall average grain size. Accordingly, such disclosure does not support a rejection of teaching or suggesting the claim 16 recited average grain

size of less than 1 micron. At page 4 of the present Action, the Examiner indicates that it would be obvious to use the process disclosure by Perry so that “the sputtering targets of Pavate et al. would have had a small a grain size as possible”. However, the combination of Perry and Pavate does not disclose or in any way suggest a method of achieving the recited average grain size of less than 1 micron.

The Examiner further indicates at page 4 of the present Action, that Perry discloses achieving of a uniformed microstructure and that one of ordinary skill in the art would therefore have expected a uniform grain size as recited in the present claims. Applicant notes that Perry merely indicates a general uniformity of microstructure (Col. 4, lines 16-17). Such general teaching does not indicate what Perry deems to be “uniform” and therefore in no way teaches or suggests that claim 16 recited grain size uniformity having a standard deviation throughout the target of less than or equal to about 15% (1-sigma). Accordingly, in combination with Pavate, which fails to disclose or suggest grain size or grain size uniformity, the Perry disclosure of a general range of grain sizes and non-defined uniformity does not contribute toward suggesting the claim 16 specifically recited average grain size of less than 1 micron and a grain size uniformity standard deviation throughout the target of less than or equal to about 15% (1-sigma). Nor does the combination of Pavate and Perry provide a reasonable expectation of achieving the recited average grain size and grain size uniformity throughout the target. Accordingly, independent claim 16 is not rendered obvious by Pavate and Perry and is allowable over these references.

As indicated above, claim 17-18 are canceled. Claim 19 is amended to properly depend from independent claim 16. Dependent claims 19-28 are allowable over Pavate and Perry for at least the reason that they depend from allowable base claim 16.

Claims 29-39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Perry, or over Perry as combined with Pavate. Independent claim 29 is amended to provide proper claim format. Claim 29 recites a copper alloy sputtering target having an average grain size of from 1 micron to about 20 micron with a grain size uniformity standard deviation of less than about 15% (1-sigma) throughout the target. Independent claim 29 is allowable over Perry and Pavate for at least the reasons similar to those discussed above with respect to independent claim 16.

Dependent claims 30-39 are allowable over Perry and Pavate for at least the reason that they depend from allowable base claim 29.

New claims 110 and 111 do not add "new matter" to the application since each is fully supported by the specification as originally filed. Each of claims 110 and 111 are fully supported by, for example, original claim 16.

For the reasons discussed above, pending claims 16 and 19-39 are allowable, and claims 110-111 are believed allowable. Accordingly, Applicant respectfully requests formal allowance of claims 16, 19-39 and 110-111 in the Examiner's next Action.

Respectfully submitted,

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